Paediatric Cookbook

Paediatric bits and pieces for your own practice

Anita Mang, MD, MRCPCH
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Bibliographical data
Author: Dr. Anita Mang, MRCPCH; General Practitioner, Paediatrician, Stadt 1, 8832 Oberwoelz, Austria; www.drmang.at

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Change history
<table>
<thead>
<tr>
<th>Version</th>
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<tbody>
<tr>
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</table>
1. Newborns / Infants < 3 mo
   1.1 Bronchiolitis ................................................................. 7
   1.2 Conjunctivitis, acute bacterial ................................... 7
   1.3 Diaper rash ............................................................... 8
   1.4 Erythema toxicum ....................................................... 8
   1.5 Infantile colic ........................................................... 9
   1.6 Labial adhesions ......................................................... 9
   1.7 Milia, Epstein-Pearls, Bohn’s nodules ...................... 9
   1.8 Seborrhoeic dermatitis, infantile ............................. 10
   1.9 Testicular descent anomalies .................................. 10
   1.10 Umbilical granuloma ............................................... 11

2. Infants > 3 mo
   2.1 Atopic eczema .......................................................... 12
   2.2 Bronchitis ............................................................... 13
   2.3 Exanthema subitum .................................................. 13

3. Toddlers / Prescoolers
   3.1 Abdominal pain ......................................................... 15
   3.2 Asthma, acute exacerbation ..................................... 16
   3.3 Chicken pox ........................................................... 16
   3.4 Constipation, acute ................................................ 17
   3.5 Erythema infectiosum .............................................. 18
   3.6 Foreign body aspiration .......................................... 18
   3.7 Gastroenteritis, acute ............................................. 19
   3.8 Hand, foot and mouth disease ................................. 19
   3.9 Herpetic gingivostomatitis ...................................... 19
   3.10 Impetigo ................................................................. 20
   3.11 Laryngitis .............................................................. 21
   3.12 Lip licking dermatitis ............................................. 22
   3.13 Measles ................................................................. 22
   3.14 Molluscum contagiosum ........................................ 23
   3.15 Mumps ................................................................. 23
   3.16 Otitis media, acute ................................................. 24
   3.17 Perianal Eczema ..................................................... 25
   3.18 Phimosis ............................................................... 25
   3.19 Pinworm ................................................................. 25
   3.20 Pneumonia, community acquired ......................... 26
3.21 Rubella ................................................................................................................. 26
3.22 Synovitis, transient ............................................................................................... 27
3.23 Trauma ................................................................................................................. 27
  3.23.1 Head trauma, minor ............................................................................................... 27
  3.23.2 Nursemaid's elbow ................................................................................................ 28
  3.23.3 Thermal injury ........................................................................................................ 28
3.24 Urinary tract infection (UTI) .................................................................................. 29
3.25 Vulvovaginitis ....................................................................................................... 30
3.26 Whooping cough ................................................................................................... 30

4. School-aged children 32
  4.1 Anaphylaxis .......................................................................................................... 32
  4.2 Pneumonia, atypical ............................................................................................. 33
  4.3 Scarlet fever ........................................................................................................... 33
  4.4 Sore throat ........................................................................................................... 34
  4.5 Tinea .................................................................................................................... 34

5. Adolescents 36
  5.1 Gastritis ................................................................................................................ 36
  5.2 Gynecomastia ....................................................................................................... 36
  5.3 Infectious mononucleosis ..................................................................................... 37
  5.4 Lyme disease ........................................................................................................ 38
  5.5 Migraine ............................................................................................................... 39
  5.6 Shingles ................................................................................................................ 39

6. Tables, Workflows, etc. 41
  6.1 Rash differentials .................................................................................................. 41
  6.2 Fever .................................................................................................................... 41
  6.3 Structured history taking ...................................................................................... 42
  6.4 Triage at the admission with AVPU ....................................................................... 42
  6.5 V/P/U: structured approach with ABCDE ................................................................. 42
  6.6 Referral to hospital (+911) ................................................................................... 44

7. Abbreviations 45

8. Literature 46

Index 47
In this cookbook you will find common paediatric diseases, that can usually be treated quickly in your GP - or Paediatric practice in Austria. You will find *every-day paediatric troubles* in different age groups. This little booklet should enable you for an easy start in your own practice - basic knowledge is required.

This cookbook was initiated as booklet to accompany a workshop based on pictures from patients. This is not meant to be a Paediatric Textbook covering all known illnesses nor a systematic work up of all rare diseases, intensive care medicine, emergency medicine or end of life care - as this is often covered elsewhere.
1. Newborns / Infants < 3 mo

1.1 Bronchiolitis

= clinical syndrome in infancy, mainly viral-induced: RSV (= 80 %), metapneumo-, parainfluenzavirus, less common adeno-, rhino-, influenza-virus

⚠️ Clinical manifestation: upper respiratory symptoms (e.g. rhinorrhoea, low-grade fever) followed by lower respiratory (small airway/bronchiole) symptoms after 24 - 72 h which results in wheezing and or crackles (rales), signs of respiratory distress (tachypnea, nasal flaring, head bobbing, chest recession), reduced oral intake, fatigue

mild course: little respiratory distress, sufficient oral intake (> 50 % of initial amount), SpO2 > 95 % in air, relatively good overall condition

✚ Treatment: parents education / information, symptomatic treatment: frequent meals, keep upper airways free with normal saline drops and suction or digestive nose drops (like Nasiben 0.01 % t.d. s up to 1 wk), cool moist air, antipyretics/antinflammatories (e.g. Ibuprofen supp > 3 mo. 1 mg/kg BW)

✚ Referral: Paediatric Hospital: reduced general condition, reduced oral intake (< 50 % of initial amount), severe respiratory distress with hypoxaemia (SpO2 < 93 % in air), cyanosis, concomitant diseases (BPD, cardiac diseases, immune deficiencies), low compliance

⚠ Caution: bradycardia, apnea

► Differential diagnosis: heart failure, pneumonia

1.2 Conjunctivitis, acute bacterial

inflammation of the conjunctivae caused by relatively harmless bacteria that normally reside on the skin (Staphylococcus aureus, Streptococcus pneumoniae, Haemophilus influenzae, Moraxella catarrhalis, S. aureus)

⚠️ Clinical manifestation: redness and purulent discharge in one eye, can be bilateral, stuck shut in the morning, often itching, foreign body

✚ Treatment: clean both eyes towards the nasal bridge with lukewarm water or NaCl 0.9 % + cotton pads; in case severe conjunctival redness/pain use Azithromycin eye drops t.d.s. for 3 d or Gentamicin eye drops q.i.d. for 7 d (or BI eye drop q.i.d: 2 ml NaCl vials 0.9 % + each 3 drops BI Solution (1:30 dilution, use daily new vial); always treat both eyes

✚ Referral: Paediatric Hospital: first few days of life, severe disease (swollen lids, pain, reduced eye-mobility, fever)

⚠ Caution: signs of preseptal or orbital Cellulitis, suspected chlamydiadal-/gonococcal-/herpes- or fungal infection

► Differential diagnosis: viral, congenital nasolacrimal duct obstruction, allergic (< 3 mo:
Newborns / Infants < 3 mo

1.3 Diaper rash

Irritant diaper dermatitis

Pathogenesis: excessive moisture, friction, increased pH, high enzymatic activity (local disruption of the skin barrier function), dysfunction of normal acidic pH of the stratum corneum (*acid mantle*) / permeability barrier / antimicrobial defense

Clinical manifestation: on convex skin surfaces that are in direct contact with the diaper (buttocks, lower abdomen, genitalia, upper thighs), skin folds (areas not in direct contact with the diaper) are classically spared. Tidewater dermatitis describes a pattern of erythema and scaling at the diaper margin due to friction and cycles of wetness and dryness in the affected areas, mild to severe from scattered erythematous papules or mild asymptomatic erythema over limited skin areas with minimal maceration and frictional irritation to superficial erosions, poss. discomfort, glossy appearance, painful erosions, papules, nodules

Treatment: general skin care measures (e.g., frequent diaper changing, air exposure, gentle cleansing e.g. with water an olive oil), choice of diapers, topical barrier preparations (zinc oxide paste like Mycostatin), if secretion: Eosin or black tea

Candidal infection (thrush)

Clinical manifestation: beefy red plaques, satellite papules, superficial pustules that leave a collarette of scale once ruptured, commonly involve the skin folds, may be a history of diarrhea, recent antibiotic use, oral thrush

Treatment: as irritative dermatitis + topical antifungals like Nystatin-zincpaste q.i.d 7 - 10 d; if oral thrush Nystatin oral 7 - 10 d

Referral: Paediatric Hospital: compliance low, refractory diaper dermatitis, susp. severe superinfection, systemic disease

Caution: type 1 diabetes mellitus, chronic mucocutaneous candidiasis, underlying immune deficiency, malnutrition, impetigo, perianal dermatitis, ...

1.4 Erythema toxicum

Also *erythema toxicum neonatorum, newborn eczema*, self-limiting pustular skin disorder affecting 30 - 60% of the full-term newborns (Preterms are extreme rarely affected), caused by excessive reaction of cutaneous immune system to non-pathogenic germs

Clinical manifestation: onset on the second day of life with erythematous macules, papules, vesicles and pustules (with sterile content), predominantly on trunk and face; usually disappears within a month; good general condition, no scars

Treatment: parents information, harmless, no specific treatment recommended, less is more

Differential diagnosis: neonatale cephale pustuloses: acneiforme folliculitis head,
Newborns / Infants < 3 mo

1.5 **Infantile colic**

affecting over 80 % in the first three months of life; approx. 10 - 15 % have severe colicky abdominal pain with prolonged crying (up to a few hours), mainly due to incomplete adaption of GI-tract (lactose?), poss. faulty feeding techniques (underfeeding, overfeeding, infrequent burping, and swallowing air), psychosocial problems

**Clinical manifestation:** excessive crying (colic) predominantly over the first 3 mo of life without any other symptoms (see below)

**Treatment:** benign self-limited condition that resolves with time, physical contact, 'flyer grip', talking down after a thorough examination and excluding differential diagnosis, lactation counselling, abdominal massages, local warmth, SAB drops t.d.s., caraway seeds supp., fennel-anise-caraway seed tea max 50 - 100 ml/d, probiotics (e.g. Lactobacillus GG).

**Referral:** Paediatric Hospital: failure to thrive; exhaustion of the family (child at risk), extensive crying with vomiting, bloody diarrhoea, ...

1.6 **Labial adhesions**

= partial or complete adhesion of small labia fused by thin membrane (do not mix with atresia of hymen); be aware and check early!

**Clinical manifestation:** mostly asymptomatic, on inspection small labia fused, UTI more likely, sometimes unpleasant smell, vaginal discharge

**Treatment:** Estrogen (Ovestin) cream o.d. for 3 - 4 wk topical on membrane, empirically 90 % success rate, parents check regularly (relapse possible), if no initial response but thin membrane - release with local anaesthetic (Xylocain 1 % gel) and dry swabs or probe followed by Estrogen cream for 1 wk

**Caution:** do not forget to check genitals at routine visits for mother-and-child pass consult

**Referral:** Paediatric Surgery: treatment failure, older girls, circumcised girl

1.7 **Milia, Epstein-Pearls, Bohn's nodules**

Milia = white papules caused by retention of keratin + sebaceous material in the pilaceous follicles, Epstein-Pearls, Bohn´s nodules = epithelial inclusion cysts (palate or gingival ridges in neonates and infants)

**Clinical manifestation:** Milia = 1 - 2 mm white papules caused by retention of keratin + sebaceous material in the pilaceous follicles, mostly nose + cheeks (40 - 50 % of all Newborns), resolve in the first few weeks of life; epithelial inclusion cysts are
asymptomatic (usually between two and four months of age), single or multiple white or translucent round papules, depending on their location, they carry the eponyms of Epstein pearls (typically seen on the palate) or Bohn nodules (typically seen on the gingival ridges).

**Treatment:** no treatment is necessary, resolve spontaneously over weeks to months

**Differential diagnosis:** neonatal /infantile acne, sebaceous cyst hyperplasia (no signs of inflammation, white macules 1 mm, selflimitting over 4 - 6 mo)

### 1.8 Seborrhoeic dermatitis, infantile

infants between the ages of 3 wk and 12 mo, about 2 - 5 % of infants, pathogenesis could be transplacental transfer of maternal androgens that stimulate growth of the infant's sebaceous glands, role of Malassezia, a lipid-dependent yeast, is not clear;

**Clinical manifestation:** erythematous plaques with greasy-looking, yellowish scales distributed on areas rich in sebaceous glands (scalp, external ear, centre of the face, intertriginous areas)

**Treatment:** education, reassurance, conservative measures (emollients and frequent shampooing) to soften and remove the scales (only in severe cases topical low potency corticosteroids o.d. 1 wk or ketoconazol 2 % shampoo 2 x / wk for 2 wk), topical creams or ointments containing zinc oxide and/or petrolatum may be applied liberally

**Referral:** Paediatric Hospital: refractory dermatitis, low compliance,

**Differential diagnosis:** Atopic dermatitiō, Diaper dermatitis, Psoriasis, Pityriasis (tinea) amiantacea, Langerhans cell histiocytosis, Tinea capitis

### 1.9 Testicular descent anomalies

= most common congenital abnormality of the genitourinary tract

**Clinical manifestation:** Retractile testes: nontraumatic, non-tender inguinal mass in the presence of an empty hemi-scrotum, can be brought back into the scrotum (exaggerated cremasteric reflex), retractile testis can be milked back into the scrotum; Ectopic Testes: ectopic testis naturally descends through the external ring, but then becomes lodged outside of the natural path, most commonly in a superficial pouch near the external ring or less commonly in the suprapubic region, femoral canal, perineum, or contralateral scrotal compartment; undescended testes: 70 % one-sided or 30 % bilateral, may present as a mass in the inguinal canal (associated with an underdeveloped scrotum)

**Treatment:** Retractile testes: no treatment, follow-up; others - follow instructions of paediatric urologist

**Differential diagnosis:** testicular torsion, inguinal or femoral hernia, spermatic cord hydrocele, inguinal lymphadenopathy, tumor

**Referral:** Paediatric Surgery: ectopic or undescended testes, genital malformation,
1.10 Umbilical granuloma

most common cause of an umbilical mass, forms in the first few weeks of life from excess tissue that persists at the base of the umbilicus after cord separation

🔍 Clinical manifestation: soft, moist, pink, usually pedunculated, friable lesion of granulation tissue that varies in size from 3 - 10 mm in length, persistent drainage of serous or serosanguineous fluid, or moisture around the umbilicus

🎉 Treatment: keep dry, topical 75% silver nitrate (lapis), 1 - 2 x / wk for 1 - 2 wk (caution: can cause chemical burns or staining of the surrounding skin)

🏥 Referral: Paediatric Hospital: susp. Infection, umbilical polyp, treatment failure

🔍🔍 Differential diagnosis: umbilical polyp, infection
2. Infants > 3 mo

2.1 Atopic eczema

also \textit{atopic dermatitis}, common, chronic, inflammatory skin disorder characterized by the presence of pruritic, eczematous dermatitis (5 - 20 \% of children), onset after 3 mo / before 5 yr, cause: positive family history of atopy (70 \%), loss-of-function mutations in the filaggrin (FLG) gene (involved in skin barrier function), skin barrier abnormalities, defects in innate immunity response, Th2-skewed adaptive immune response, altered skin resident microbial flora

\textbf{Clinical manifestation:}

\textbf{acute}: intensely pruritic erythematous papules, vesicles with exudation, crusting;

\textbf{subacute or chronic}: dry, scaly, excoriated erythematous papules, skin thickening from chronic scratching (lichenification), fissuring; most patients have cutaneous hyperreactivity to various environmental stimuli (food, inhalant allergens, irritants, changes in physical environment (including pollution, humidity, etc.), microbial infection, stress;

\textbf{age specific differences}: infants / young children lesions on extensor surfaces, cheeks, scalp, usually sparing of the diaper area; older children / adolescents: less exudation, lichenified plaques in a flexural distribution (esp. antecubital, popliteal fossae, volar aspect of the wrists, ankles, and neck, reticulate pigmentation, the so-called \textit{atopic dirty neck}, adults: more localized and lichenified, skin flexures, may involve the face, neck, or hands; In all age groups, any area of the body can be involved in severe cases

\textbf{Treatment:}

\textbf{General}
- avoid being too hot or sweating too much, very dry air, stress, sudden temperature changes, harsh soaps or cleaning products, perfumes, wool or synthetic fabrics (like polyester)
- keep fingernails short, infants use gloves if tolerated over night
- keep skin moist: daily bathing possible with pH-neutral shower gel, then change water, \textit{Balneum Hermal} (> 1 yr, not suitable for children with soy allergy), dry with soft towel, poss. wet wraps
- ointment/cream/lotion: stick to 3-minutes-rule after taking bath,
- use sun protection

\textbf{Basic care}
according to clinical stage of disease, the earlier the better!

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<th>Clinical manifestation</th>
<th>Treatment</th>
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<tr>
<td>dry / not erythematous</td>
<td>ultrabas ointment b.i.d. (40 - 70 % lipid)</td>
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<td>moisturizer glycerol 10 %, dexpanthenol 5 %, &gt; 3 yr: poss. urea 5 - 10 %</td>
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## Clinical manifestation | Treatment
--- | ---
dry / slightly erythematous | ultrabas/ultrasic b.i.d. to t.i.d., lipolotion (hydrophilic cream, 40 - 50 % lipid), moisturizer glycerol 10 %, dexampanthenol 5 %
erythematous / exsudation | ultrasic b.i.d. to t.i.d. (20 % lipid)

### Antiinflammatory care
as long as erythematous / exsudating: black tee wet wraps or Eosin 0.5 % dapping, if severe: Advantan cream (or lotion) 0.1 % trunk + extremities (not genital) max. o.d. in the evening on erythematous areas, apply thin, within 3 min after bath for 5 d, taper slowly (Caution: rebound), avoid in face/head

⚠️ **Referral: Paediatric Hospital:*** treatment failure (Specialist: syst. corticosteroids, evt. Elidel cream 1 % or Protopic)

Generally not recommended
- Food avoidance without professional testing (Caution: malnutrition!)
- polidocanol
- antihistamins (evt. fenistil as *sleeping pill*)

![ Caveat: ](https://example.com) **Differential diagnosis:** psoriasis, allergic contact dermatitis, seborrhoeic dermatitis

### 2.2 Bronchitis
> 6 mo, cause see bronchiolitis

⚠️ **Clinical manifestation:** upper respiratory symptoms (e.g. rhinorrhoea, low-grade fever) followed by lower respiratory (small airway/bronchiole) symptoms after 24 - 72 h which results in wheezing and or crackles (rales), signs of respiratory distress (tachypnea, nasal flaring, head bobbing, chest recession), reduced oral intake, fatigue

**mild course:** little respiratory distress, sufficient oral intake (> 50% of initial amount), SpO2 > 95 % in air, relatively good overall condition - manage at home

⚠️ **Treatment:** see bronchiolitis - in addition: salbutamol inh 0.1 mg + chamber + mask, initially 4 puffs every 3 - 4 h, reduce slowly over 1 wk, moist air, usually not steroids indicated (unless susp. asthma)

⚠️ **Referral: Paediatric Hospital:** see bronchiolitis

⚠️ **Differential diagnosis:** Bronchiolitis, Asthma bronchial, cystic fibroses, foreign body aspiration, atyp. pneumonia

### 2.3 Exanthema subitum
also *Roseola infantum, Roseola infantum, three-day fever,* caused by human herpesvirus 6 (HHV-6), duration of shedding is thought to be lifelong, mean incubation period 9 - 10 d
Clinical manifestation: 3 - 5 d high fever (may exceed 40 °C) that resolves abruptly, followed by development of a rash (blanching macular or maculopapular, starting on the neck and trunk and spreading to the face and extremities, generally nonpruritic, persists for 1 - 2 d)

Caution: febrile seizure, Erythematous tympanic membranes (not AOM!)

Differential diagnosis: FUO (bact. infection?)

Treatment: symptomatic (Ibuprofen, Paracetamol, cold wraps, sufficient fluid

Isolation: not necessary

Referral: Paediatric Hospital: unwell, susp. bacterial infection, seizure
3. Toddlers / Preschoolers

3.1 Abdominal pain

one of the most common complaints in childhood, often self-limited minor condition (constipation, gastroenteritis, mesenteric lymphadenitis, functional, food intolerance), challenge: potentially life-threatening condition - see Caution/Differentials

 лечение: talking down, keep comfortable, local warmth, tea, low-fat diet, Paracetamol or Metamizole

⚠️ Caution: most common serious illnesses: appendicitis: pain in the right lower quadrant, guarding and pain on movement, migration of periumbilical pain to the right lower quadrant (chameleon!), poss. fever, raised inflammatory markers; intussusception: invagination of a part of the intestine into itself, causing obstruction, pain suddenly, intermittent, severe, inconsolable crying with drawing up of the legs toward the abdomen, gross blood or currant jelly stool

👩‍⚕️ Differential diagnosis: furthermore:

腹部: intussusception, trauma, foreign body (magnet ingestion), adhesions, abscess/Meckel's diverticulum, hepatitis, inflamm. bowel disease, primary bacterial peritonitis, cholecystitis or cholelithiasis, perforated ulcer, pancreatitis, parasites, …;

systemic: Strep. pharyngitis, toxin, food allergy, malabsorption (coeliac disease etc.), tumour, diabetic ketoacidoses, Haemolytic uraemic syndrome, Henoch Schönlein purpura, abdominal migraine, familial Mediterranean fever, sickle cell syndrome vasoocclusive crisis, …; heart / lung: Pneumonia, myocarditis, pericarditis, …;

生殖泌尿: Urinary tract infection, urolithiasis ovarian torsion, ruptured ovarian cyst, testicular torsion, …

ยาย Referral: Paediatric surgery: see Caution / Differentials
### 3.2 Asthma, acute exacerbation

**Figure 1:** Treatment: general measures: insure fluid intake orally, wet wraps, cool moist air, no codein / mucolytics, follow up in 1 - 2 d, specific: as table above

- **Referral: Paediatric Hospital:** < 6 mo, RR > 60/ min in infants or > 40 - 50 in preschoolers, nor adequate therapeutic response, dehydration, O2 < 92 %, underlying disease, low compliance.

### 3.3 Chicken pox

Varicella-zoster virus (VZV, herpesvirus), causes varicella (*chickenpox*) and herpes zoster (*shingles*). Chickenpox is highly contagious, transmission: aerosolized droplets from nasopharyngeal secretions, direct cutaneous contact with vesicle fluid from skin lesions; Incubation period 2 wk (10 - 21 d), infectivity 2 d prior onset of rash until skin lesions have fully crusted, reinfection occur rarely in immunocompetent
Clinical manifestation: usually benign self-limiting in immunocompetent, prodrome of fever, malaise, pharyngitis, loss of appetite, followed by generalized vesicular rash, pruritic, begin as macules/papules/vesicles; pustular component/crusted papules, typically in different stages, face, trunk and extremities duration approx. 1 wk

Caution: Skin/soft tissue infections, invasive group A streptococcal soft tissue infection, cellulitis, myositis, necrotizing fasciitis, toxic shock syndrome, Encephalitis, Reye syndrome, transient focal deficits, aseptic meningitis, transverse myelitis, vasculitis, and hemiplegia, pneumonia, immunosuppressed varicella hepatitis

Treatment: supportive: shower (no bath), topical zinc lotion, antihistamines, keep fingernails short, Paracetamol (fever), NO Salicylates should be avoided (Reye syndrome), avoid NSAIDs (higher rate of Superinfection/necroses); Acyclovir in immunocompromised po, in severe cases i.v.

Referral: Paediatric Hospital (inform first!): fever, unwell, septic, susp. complication (see Caution), immunocompromised

Isolation: at home if at all possible

Vaccination: Varilrix 2 x + no booster (be aware: life vaccine!), also protects from shingles, poss. combination vaccine: MMR-V

### 3.4 Constipation, acute

up to 30% of children, 3 - 5% of all visits to paediatricians, peak prevalence preschool years, 95% functional (psychosocial and environmental factors)

Clinical manifestation: infrequent bowel evacuation, hard small faeces, difficult or painful evacuation of large-diameter stools, faecal incontinence (voluntary or involuntary evacuation of faeces into underwear = encopresis), abdominal pain, anal fissures, pruritus, vomiting, anorexia

Treatment: adequate fluid intake, avoid sweets, physical exercise, nondigestible osmotically active carbohydrates, osmotic laxatives and/or occasional glycerin suppositories, if necessary; mineral oil, enemas, stimulant laxatives if >1y; bowel retraining: disimpaction, Prolonged laxative treatment and behaviour therapy to achieve regular evacuation and avoid recurrent constipation, dietary changes (primarily increasing fibre content) to maintain soft stools, gradual tapering and withdrawal of laxatives as tolerated, NO phosphate enema!

Caution: Delayed passage of meconium (first meconium passed after 48 h of life), fever, vomiting, or diarrhea, rectal bleeding (unless attributable to an anal fissure), severe abdominal distension, constipation present from birth or early infancy, Ribbon stools (very narrow in diameter), urinary incontinence or bladder disease, weight loss or poor weight gain, delayed growth (i.e. decreasing height percentiles), extraintestinal symptoms (especially neurological deficits), congenital anomalies or syndromes associated with Hirschsprung disease (i.e. Down syndrome), family history of Hirschsprung disease

Referral: Paediatric Surgery / Paediatric Hospital: admit for investigation if signs as
3.5 **Erythema infectiosum**

also *Fifth disease*, *Human parvovirus B19* (Paroviridae family), transmission: respiratory, vertical, heterogeneous, most contagious 5 - 15 d after exposure, no longer infectious if rash appears

⚠️ **Clinical manifestation:** in an otherwise normal, healthy individual first week: non-specific flu-like illness (fever, malaise, myalgia, coryza, headache, pruritus), Haematologic abnormalities (reticulocytopenia, reduced haemoglobin concentration, leukopenia, and/or thrombocytopenia can be seen), following week: red-flushed cheeks - *slapped cheek* appearance, than maculopapular rash, predominantly arms, legs, lower abdomen, overall well, poss. low-grade fever, arthralgia

⚠️ **Caution:** arthritis, transient aplastic crisis in those with chronic haemolytic disorders (transient aplastic crisis), fetal infection leading to non-immune fetal hydrops, intrauterine fetal death, miscarriage, pure red blood cell aplasia in immunocompromised individuals

⚠️ **Treatment:** symptomatic with NSAIDs, in most cases no treatment needed

⚠️ **Referral: Paediatric Hospital:** all patients - see caution above (inform Paediatrician on call!!)

3.6 **Foreign body aspiration**

![Diagram](image)

Figure 2: foreign body aspiration in children, (according to: European Resuscitation Council, Guidelines for Resuscitation 2015, Section 6: Paediatric Life Support)

⚠️ **Referral: Paediatric Hospital:** in any case unless foreign body removed / child very well
3.7 **Gastroenteritis, acute**

most common causes of acute viral gastroenteritis in children: rotavirus, norovirus, sapovirus, astrovirus, enteric adenoviruses

⚠ *Clinical manifestation:* increased stool frequency (e.g., ≥ 3 loose or watery stools in 24 h or a number of loose/watery bowel movements that exceeds the child’s usual number of daily bowel movements by two or more), with or without vomiting, fever, or abdominal pain, abdominal cramps, anorexia, headache, and myalgia, usually lasts < 1 wk and not > 2 wk ( > 14 d is persistent or chronic)

⚠ *Caution:* bacterial (Salmonella, Shigella, Campylobacter, Yersinia, EHEC) and parasitic gastroenteritis, extraintestinal infections, non infectious conditions

⚠ *Treatment:* usually an acute and self-limited disease that does not require pharmacologic therapy, correcting fluid deficit and electrolyte imbalance orally, breastfeeding can continue during diarrhea, within the age-appropriate diet, complex carbohydrates, lean meats, yoghurt, fruits, and vegetables are better tolerated than foods containing high levels of fats and simple sugars, foods high in simple sugars (e.g., sugar sweetened beverages, some fruit juices) may increase stool output

⚠ *Referral: Paediatric Hospital:* Severe volume depletion, moderate volume depletion with refusal of oral fluids, clinical deterioration, intractable or bilious vomiting, failure of oral rehydration, neurological abnormalities (e.g. lethargy, seizures), possibility of severe illness or condition other than acute gastroenteritis that requires specific therapy (e.g. bowel obstruction), inability to assure adequate home management and outpatient follow-up

3.8 **Hand, foot and mouth disease**

caused by coxsackievirus A (like summer-flu, herpangina), incubation period 3 - 5 d, mainly in children < 5 yr, transmission fecal-oral route

⚠ *Clinical manifestation:* Hand, foot, and mouth disease: oral enanthem and a macular, maculopapular, or vesicular rash of the hands and feet (and possibly other locations); Herpangina: fever, painful papulo-vesiculo-ulcerative oral enanthem

⚠ *Treatment:* symptomatic (see stomatitis)

⚠ *Caution:* rhombencephalitis (brainstem encephalitis), acute flaccid paralysis, aseptic meningitis, myocarditis, pancreatitis (rare), fetal loss (rare), conjunctival ulceration (rare)

⚠ *Referral: Paediatric Hospital:* poor general condition, dehydration, susp. complication

3.9 **Herpetic gingivostomatitis**

= most common manifestation of primary herpes simplex virus (HSV-1) infection, transmission: direct contact with infected oral secretions or lesions, incubation: 2 d -
2 wk, virus persists in cell nuclei (e.g. the trigeminal ganglion), where it remains latent. Reactivation: labial herpes

Clinical manifestation: ulcerative lesions of buccal mucosa, tongue, gingiva, hard palate, and pharynx, red, oedematous marginal gingivae that bleed easily and clusters of small vesicles, surrounded by a red halo, often with perioral vesicular lesions, can form large, painful oral ulcers, bleed easily, black crusts, bad breath, refusal to drink, anorexia, fever, arthralgia, headache, and submandibular or cervical lymphadenitis, typically heal without scarring (may require up to 21 d)

Caution: Dehydration, herpetic whitlow, herpetic keratitis from autoinoculation, secondary bacteraemia with upper respiratory bacteria, Esophagitis, epiglottitis, or pneumonitis (particularly in immunocompromised children), Encephalitis, Eczema herpeticum in children with atopic dermatitis, lip adhesions

Treatment: supportive care: fluid intake, analgesics, antipyretics, oral rinses, topical barrier cream (e.g., petroleum jelly) to the lip, bepanthen mouth-wash, viscous lidocaine is controversial; Aciclovir only sufficient if started within first 24 h

Differential diagnosis: Herpangina, Hand, foot, and mouth disease, Oral candidiasis, Aphthous ulcers, Stevens-Johnson syndrome, Behçet syndrome

Referral: Paediatric Hospital: Inability to maintain adequate hydration, immunocompromised, newborns, see Caution

3.10 Impetigo

contagious superficial bacterial infection, most frequently 2 - 5 yr, although older children of any age and adults may also be affected, spread among individuals in close contact; often group A Streptococcus (GAS) and Staphylococcus aureus, incubation period: 1 - 3 d

Clinical manifestation:

Non-bullous impetigo: most common form, lesions begin as papules - progress to vesicles surrounded by erythema - pustules - thick, adherent crusts with a characteristic golden appearance (evolution usually over 1 wk), usually face and extremities, multiple lesions may develop, regional lymphadenitis, no systemic symptoms;

Bullous impetigo: vesicles enlarge to form flaccid bullae with clear yellow fluid, which later becomes darker and more turbid; ruptured bullae leave a thin brown crust, trunk is more frequently affected (due to strains of S. aureus that produce exfoliative toxin A)

Ecthyma: lesions extend through the epidermis and deep into the dermis causing punched-out ulcers covered with yellow crust surrounded by raised violaceous margins

Caution: rheumatic fever, post-streptococcal GN, high fever/unwell, in atopic dermatitis

Treatment: hygiene, local antiseptics (Octenisept), Cefalexin (Ospexin) 50 mg/kg BW in 3 doses 7 d (alternative Amox/Clav), No topical antibiotics!
3.11 Laryngitis

we refer to viral laryngotracheitis caused by Parainfluenza-, RSV-, Adeno-, Influenza-, Measles-, Rhino-, Metapneumo-Virus, ...; variety of upper respiratory conditions in children are often called croup: laryngitis, laryngotracheitis, laryngotracheobronchitis, bacterial tracheitis, or spasmodic croup, laryngeal diphtheria (diphtheritic or membranous croup)

Clinical manifestation: hoarseness, typical barking cough, inspiratory stridor, respir. distress, often signs of upper respir. tract infection (viral)

Treatment: according to:

Westley croup severity score

<table>
<thead>
<tr>
<th>Sign</th>
<th>Points</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stridor</td>
<td>0</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>with agitation</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>at rest</td>
</tr>
<tr>
<td>Retractions</td>
<td>0</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>mild</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>moderate</td>
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<tr>
<td></td>
<td>3</td>
<td>severe</td>
</tr>
<tr>
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<tr>
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</tr>
<tr>
<td></td>
<td>2</td>
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</tr>
<tr>
<td>Cyanosis</td>
<td>0</td>
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</tr>
<tr>
<td></td>
<td>4</td>
<td>with agitation</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>at rest</td>
</tr>
<tr>
<td>Level of consciousness</td>
<td>0</td>
<td>normal, including sleep</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>disoriented</td>
</tr>
</tbody>
</table>
### 3.12 Lip licking dermatitis

= chronic irritant contact dermatitis caused by repeated exposure to saliva of lips and perioral area (chronic lip-licking behaviour)

⚠️ **Clinical manifestation:** Erythema with hyperpigmentation, scaling, fissures form a well-demarcated ring around the lips, or in shape of dummy

⚠️ **Caution:** no topical steroids!

🎉 **Treatment:** change behaviour, zinc paste (e.g. Cicaplast baume B5), in case of superinfection with candida - add Clotrimazol 1 %

🎉 **Differential diagnosis:** Perioral (periorificial) dermatitis (often caused by top. steroids, rash diffuse periorally), impetigo, allergic contact dermatitis, seborrhoeic dermatitis

### 3.13 Measles

= highly contagious viral illness (Paramyxovirus), worldwide 5th most common cause of death in children < 5 years of age, contagious 5 d before rash - 4 d after, incubation period 6 - 21 d

🎉 **Clinical manifestation:** flu-like Phase (2 - 8 d): fever, malaise, anorexia, followed by conjunctivitis, coryza, cough, Enanthem (Koplik’s spots grains of salt on a red
Exanthem phase (2-8d): erythematous, maculopapular, blanching rash, begins face and spreads cephalocaudally and centrifugally to involve the neck, upper trunk, lower trunk, and extremities. Early on blanching; later non - may include petechiae or be hemorrhagic, palms and soles are rarely involved. Lymphadenopathy, high fever (peaking two to three days after appearance of rash), pharyngitis, nonpurulent conjunctivitis.

⚠️ Caution: acute disseminated encephalomyelitis, subacute sclerosing panencephalitis, secondary infection, giant cell pneumonia

➕ Treatment: supportive; no specific antiviral therapy approved, antipyretics, fluids, treatment of bacterial superinfections, role for vitamin A in certain settings, in immunocompromised: Ribavirin trial

➕ Referral: Paediatric Hospital (inform first!): susp. complication, < 1 yr, immunocompromised

ℹ️ Isolation: stay at home! inform health authority

☀️ Vaccination: MMR 2 x + gen. no booster required (see national vaccination programme)

### 3.14 Molluscum contagiosum

Poxvirus-infection, spread by direct skin-to-skin contact, transmitted via autoinoculation by scratching or touching a lesion, incubation 2-6 wk

⚠️ Clinical manifestation: chronic localized infection: firm, dome shaped flesh-coloured papules, 2-5 mm, shiny surface, central indentation or umbilication, occasionally polypoid with a stalk-like base, Pruritus may be sometimes become visibly inflamed, anywhere on the body except palms / soles

➕ Treatment: self-limiting

⚠️ Caution: atop. Dermatitis, Immunosuppression

➕ Referral: Dermatology: in severe cases / unpleasant area: cryotherapy, curettage, some topical agents like salicylic acid

### 3.15 Mumps

= contagious viral illness (paramyxovirus), respiratory droplets, direct contact, incubation 2-3 wk, infectious 2 d before - 5 d after onset of parotitis

⚠️ Clinical manifestation: few days of fever, headache, myalgia, fatigue, anorexia, followed by parotitis; usually self-limited.

⚠️ Caution: orchitis or oophoritis, meningitis, encephalitis, deafness, arthritis, myocarditis, pancreatitis

➕ Treatment: supportive (analgesic/antipyretics), no specific antiviral therapy approved, warm or cold packs
**3.16 Otitis media, acute**

AOM is mostly viral induced, caused by obstruction of the eustachian tube - fluid retention / suppuration of retained secretion, if bacterial superinfection mainly: Strep. pneumoniae, Haemophilus influenzae, Group A Strep, Staph. aureus, Moraxella catarrhalis

**Clinical manifestation:** often preceding upper respiratory tract infection or exacerbation of seasonal allergic rhinitis, acute otalgia, decreased hearing, often fever, typically but not always unilateral, ear inspection: bulging tympanic (effusion), ear-drum erythematous, cloudy, yellowish, opaque, if ruptured may also be associated purulent otorrhea, conductive hearing loss

**Treatment:** AOM due to viral respiratory pathogen: supportive (NSAIDs, decongestants, rest) for 3 d

**indication for oral antibiotic therapy:** < 6 mo, < 2 yr. +severe AOM, > 2 yr + nor improvement with supportive care:

- Amoxicillin (OSPAMOX): 50 - 60 mg/kg BW/d in 3 doses (max. 3 g/d) - < 2 yr: 7 - 10 d, > 2 yr: 5 - 7 d;

**if no improvement / recurrence:**

- Amoxicillin + Clav.: 70/10 mg/kg BW/d in 2 - 3 doses (max. 3 g/d), 5 - 10 d OR
- Cefuroxim (ZINNAT, Elobact): 30 mg/kg BW/d in 2 doses (max. 1 g/d)

**if Penicillin allergy:**

- Clarithromycin (KLACID): 15 mg/kg BW/d in 2 doses (max. 1 g/d), for 7 d OR
- Azithromycin (ZITHROMAX): 10 mg/kg BW/d in 1 dose (500 mg/d), for 3 d

**Penicillin allergy without Anaphylaxis/Urtikaria:**

- Cefuroxim (ZINNAT, Elobact): 30 mg/kg BW/d in 2 Doses (max. 1 g/d)

**Caution:** facial nerve palsy, mastoiditis, labyrinthitis, permanent hearing loss, petrositis, epidural, subdural, and brain abscess, meningitis, sinus thrombosis

**Referral: Paediatric Hospital:** in case of complications, poor general condition, compliance-problem, permanent recurrence (effusion, cong. anomalies, ...)

**Differential diagnosis:** otitis externa (painful ear examination!), eustachian tube dysfunction, nasopharyngeal pathology including herpes zoster infection
3.17 Perianal Eczema

common, mostly mixed skin pathogens, due to lack of hygiene and local irritation or sign of overflow in constipation

Clinical manifestation: perianal eczema with redness, pain with defecation, pruritus, sometimes blood-streaked stools, perinatal fissures, smell

Caution: signs of overflow (constipation), cherry red: Strep A Infection (swab!): Streptococcal perianal dermatitis

Treatment: see vulvovaginitis, if Strep A pos.: Cefalexin orally 7 d

Differential diagnosis: Herpes simplex virus infection, child abuse, constipation

3.18 Phimosis

inability to retract the foreskin (prepuce), physiologic: almost all newborn males (if stream strong, straight, no ballooning of the foreskin, no pain while voiding), pathologic: foreskin truly non retractable secondary to distal scarring of the prepuce (preputial fibrosis due to infection and inflammation)

Treatment:

physiologic: usual body-hygiene to prevent infection, Stretching exercises (gentle), avoid forcible retraction to avoid pathologic phimosis, one should always than be pulled down to its normal position,

Med: Advantan Creme 0.1 % od topical min. 3 wk (recurrence possible)

Caution: Paraphimosis

Referral: Paediatric Surgery: signs of pathologic phimosis, paraphimosis (poss. circumcision)

3.19 Pinworm

= Enterobius vermicularis, most common nematode infections worldwide, humans only natural host, transmission in closed, crowded conditions, common within families (eggs may become airborne, inhaled, and swallowed)

Clinical manifestation: often asymptomatic, perianal itching (inflammatory reaction to adult worms and eggs), predominantly at night, occ. abdominal pain, nausea, vomiting, No peripheral eosinophilia, pinworm paddle test: adult worms white, pin-shaped, and 8 - 13 mm long

Caution: treat the whole family! adult worms can migrate to extraintestinal sites (vulvovaginitis, urinary tract infections, salpingitis, oophoritis, cervical granuloma, peritoneal inflammation)

Treatment: all bedding, clothes washed (60 °C), hygienic measures, such as clipping of fingernails, frequent handwashing, baths, reinfection is common, despite effective
3.20 **Pneumonia, community acquired**

Acute infection of the pulmonary parenchyma in a patient who has acquired the infection in the community, common, potentially serious illness with considerable morbidity. *Streptococcus pneumoniae* is the most frequent.

- **Clinical manifestation:** Abrupt onset, ill-appearance, chills, moderate to severe respiratory distress (almost always tachypnea), focal auscultatory findings, localized chest pain, WBC > 15,000/mcL, elevated CRP (if obtained), abdominal pain;

- **Pneumonia viral:** Usually children < 5 yr, gradual onset, preceding upper airway symptom, nontoxic appearing, diffuse, bilateral auscultatory findings, wheezing, may have associated rash (e.g., measles, varicella); cough may persist for up to 4 months, moderate dyspnea on exertion for 2 - 3 mo; .

- **Treatment:** If *viral pneumonia*: NO antibiotic treatment is indicated!, supportive care, cough medicine (herbal remedies without alcohol, shugger), sufficient fluid intake, rest; susp. bacterial pneumonia: amoxicillin (50 - 100 mg/kg BW/d b.d. or tds; max. 4 g/d), non-type 1 hypersensitivity reactions to penicillin: second- or third-generation cephalosporin, with type 1 hypersensitivity reactions: clindamycin or macrolide

- **Caution:** Consider other pathogens according to clinical manifestations, avoid chest-x-ray in typical course

- **Referral:** Paediatric Hospital: <6 months, hypoxemia (SpO2 <90% in air), Dehydration, inability to maintain hydration/feed orally; moderate to severe respiratory distress (RR > 70/min < 1 yr, RR > 50/min > 1 yr, difficulty breathing (grunting, nasal flaring, retractions), pathogen with increased virulence (Staphylococcus aureus or group A Streptococcus), failure of outpatient therapy (worsening or no response in 48 - 72 h)

- **Differential diagnosis:** Pneumonia atypical⁴³, aspiration pneumonia, Whooping cough⁴⁰, Atelectases, round pneumonia: congenital lung sequestration, metastatic Wilms tumor, cavitary necrosis, pleural pseudocyst, primary lung carcinoma, tuberculoses, pleural effusion/empyema, Lung abscess, necrotizing pneumonia, pneumatocoele

- **Isolation:** Stay at home if relatively well

- **Vaccination:** Pneumococcal vaccine 3 x 1st yr of life

3.21 **Rubella**

Rubellavirus (Togavirus), droplet infection, incubation period 2 - 3 wk, contagious 1 - 2 wk before signs - 1 wk after
Clinical manifestation: generally mild, often subclinical or asymptomatic, maculopapular rash (pinpoint, pink maculopapules), appears on the face, spreads caudally to the trunk / extremities, generalized within 24 h, lasts 3 d, mild nonexudative conjunctivitis, enanthem on the soft palate (Forchheimer spots), occasionally acute

Caution: Congenital rubella syndrome (hearing loss, learning difficulties, cardiovascular and ocular defects), post infectious encephalitis, progressive rubella panencephalitis, thyroiditis, arthralgias, arthritis, haemorrhagic complications

Treatment: supportive (analgesic/antipyretics), no specific antiviral therapy approved

Referral: Paediatric Hospital (inform first!): susp. Complication, immunocompromised, pregnant

Isolation: stay at home! inform health authority

Vaccination: MMR 2 x + gen. no booster required (see national vaccination programme)

3.22 Synovitis, transient

common, aetiology is unclear; up to 50 % have had a recent upper respiratory tract infection (URI)

Clinical manifestation: sudden onset of pain and limitation of motion in the hip, cannot walk since this morning, symptoms < 1 wk, fever typically is absent or low grade, resolving gradually, ultrasound can detect bilateral effusions in 25 %, low inflammatory markers (WBC < 12,000, ESR < 20 mm/h, CRP < 2 mg/dL

Treatment: NSAIDs, return to full activity as tolerated, prognosis excellent

Caution: pain > 1 week, fever, see DD

Differential diagnosis: Septic arthritis, Septic arthritis of the sacroiliac joint, osteomyelitis, psoas abscess, Appendicitis, Idiopathic chondrolysis of the hip, Legg-Calvé-Perthes and secondary avascular necrosis, Slipped capital femoral epiphysis, stress fracture, neoplastic

Referral: Paediatric Hospital: DD

3.23 Trauma

3.23.1 Head trauma, minor

Clinical manifestation:

< 2 yr: history or physical signs of blunt trauma to the scalp, skull, brain, alert or awakens to voice or light touch (clinical assessment more difficult, frequently asymptomatic, skull fractures or clinically important traumatic brain injury (cTBI) may occur despite minor trauma, inflicted injury more frequently)
> 2 yr: GCS of 14 or 15 at the initial examination, no abnormal or focal neurological findings, no physical evidence of skull fracture

**Treatment:** cool pack, talking down, NSAIDs, watch and wait (PECARN rule*)

**Caution:** Seizures, loss of consciousness, disorientation, vomiting, obvious skull fractures: haemotympanum, CSF oto- or rhinorrhea, periocular / posterior auricular haematoma, red. GCS, large Scalp haematoma; susp. of child abuse

**Referral:** Paediatric Surgery: if any suspicion of more than mild head trauma - see caution

*PECARN, the Pediatric Emergency Care Applied Research Network, is the first federally-funded pediatric emergency medicine research network in the United States.

### 3.23.2 Nursemaid's elbow

Radial head subluxation, most common elbow injury in children, typically 1 - 4 yr, typical history: forearm pulled while pronated and elbow extended (grabs the arm to prevent the child from falling or pulling, swung by the forearms or during play)

**Clinical manifestation:** hold the affected arm close to body, elbow either fully extended or slightly flexed, forearm pronated, little distress unless attempts are made to move elbow

**Treatment:**

**Hyperpronation method:** examiner supports child's arm at the elbow, places moderate pressure with a finger on the radial head, grips the child's distal forearm with the other hand and hyperpronates the forearm, click may be felt by the finger over the radial head when the displacement is reduced

**Supination / flexion method:** examiner supports the child's arm at elbow, exerts moderate pressure on the radial head with one finger, with other hand hold distal forearm, then pulls with gentle traction, supinate the child's forearm, then fully flexes the elbow in one smooth motion

**Differential diagnosis:** Fracture, Posterior elbow dislocation

**Referral:** Paediatric Surgery: suspected DD, no practice in manoeuvre

### 3.23.3 Thermal injury

Low grade thermal injury: Superficial (prev. 1°), Superficial partial-thickness (prev. 2°) can often be treated in practice if: Isolated injury (i.e. no suspicion of inhalation or high-voltage injury), does not involve face, hands, perineum, feet, does not cross major joints, is not circumferential, no relevant commodities

**Clinical manifestation:** Superficial (prev. 1°): dry, red, blanches with pressure, painful, healing 3 - 6 d; Superficial partial-thickness (prev. 2°): blisters, moist, red, weeping, blanches with pressure, healing 7 - 21 d,
Treatment: removing clothing and debris (remove sloughed or necrotic skin, including ruptured blisters, NO needle aspiration of intact blisters), cooling (with room-temperature or cool tap until relief, max. 5 min, may be covered with wet gauze or towels up to 30 min, iced water should be avoided), simple cleansing (washing with mild soap / tap water), non-alcoholic chlorhexidin, appropriate sterile skin dressing (dry, nonstick gauze only), pain management (NSAIDs, Acetaminophen, combination with opioids), tetanus prophylaxis, NO topical antimicrobial agent, nonperfumed moisturising as needed, NO systemic prophylactic antibiotics, NO role for topical steroids, follow up in 2 d

Referral: Paediatric Surgery: deep partial thickness/full-thickness burns (prev. > 2°) - (no local pain!), susp. child abuse (sharply demarcated edge, distinct shape of an object, small circular burns matching a cigarette or cigar tip, perineal area matching a dip-in pattern (e.g., child dipped into scalding water), severe pain

### 3.24 Urinary tract infection (UTI)

= pos. history + symptoms + leukocyrturia + sign. bacteriuria (monoculture)

assess risk factors: poor urine flow, recurrent UTI, recurrent fever of uncertain origin, antenatally diagnosed renal abnormality, family history of vesicoureteric reflux (VUR) or renal disease, constipation, dysfunctional voiding, enlarged bladder, abdominal mass, evidence of spinal lesion, poor growth, high blood pressure

Clinical manifestation:

<table>
<thead>
<tr>
<th>Age group</th>
<th>Symptoms and signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 3 month</td>
<td>Fever, Vomiting, Lethargy, Irritability, Abdominal pain, Jaundice, Haematuria, Offensive urine</td>
</tr>
<tr>
<td>Preverbal</td>
<td>Fever, Abdominal pain, Loint tenderness, Vomiting, Poor feeding, Lethargy, Irritability, Haematuria, Offensive urine, Failure to thrive</td>
</tr>
<tr>
<td>≥ 3 month</td>
<td>Frequency, Dysuria, Changes to continence, Abdominal pain, Loin tenderness, Fever, Malaise, Vomiting, Haematuria, Offensive urine, Cloudy urine</td>
</tr>
</tbody>
</table>

Caution: appropriate urine collection is essential: non invasive: clean catch urine sample, cleaned mid-stream urine (if unobtainable: urine bag, urine pads), invasive: if non invasive not possible - catheter samples or suprapubic aspiration guidancesend or urine culture needed (susp. acute pyelonephritis/upper urinary tract infection, risk of serious illness, under 3 mo, recurrent UTI, does not respond to treatment within 24 – 48 h); the younger the more likely CAKUT (caution: Pyoureter!)

Treatment:
Cystitis/afebrile UTI: po Ceclor (Cefaclor) 40 mg/kg BW/d in 2 doses; po Biocef (Cefpodoxim) 12 mg/kg BW/d in 2 doses; po Augmentin Duo (Amox/Clav) 80 mg/kg BW/d in 2 doses; po Ciproxin (Ciprofloxacin) 20 - 40 mg/kg BW in 2 doses; Duration 3-5 d

febrile UTI: Pyelonephritis typical: > 6 mo, US normal, well appearance/good compliance: po Ceclor (Cefaclor) 40 mg/kg BW/d in 2 doses, po Biocef (Cefpodoxim) 12 mg/kg BW/d in 2 doses, po Augmentin Duo (Amox/Clav) 80 mg/kg BW/d in 2 doses, po Elobact (Cefuroxim) 20 - 30 mg/kg BW/d in 2 doses; Duration: po. 7-(10) d

Referral: Paediatric Hospital: < 6 mo febrile UTI, first febrile UTI (ultrasound to exclude anomaly of urinary tract), susp. atypical UTI (seriously ill, poor urine flow, abdominal or bladder mass, raised creatinine, septicaemia, failure to respond to treatment with suitable antibiotics within 48 h, infection with non-E. coli organisms)

3.25 Vulvovaginitis

mainly non-specific infection, risk factors: Lack of labial development, unestrogenized thin mucosa, alkaline pH (pH 7), poor hygiene, obesity, foreign bodies, choice of clothing (leotards, tights, and blue jeans), masturbation, incontinence, constipation

Clinical manifestation: non specific mucoid discharge and/or odor, pruritus

Treatment: cotton underpants, no fabric softeners for underwear, avoid tights, leotards, leggings, daily bath: soak in clean water (no soap) for 10 - 15 min, soap at end of bath, limit use of any soap on genital areas, zincpaste/cream, emphasize wiping front-to-back after bowel movements, have her sit with knees apart to reduce reflux of urine into the vagina or sit backwards on the toilet, avoid wet swimsuits for long periods, treat risk factors

Caution: risk factors, chaperone for clinical assessment!

Differential diagnosis: pinworm, respiratory and enteric flora - infection, candida, gardnerella vaginalis, sexually transmitted diseases (Neisseria gonorrhoea, Chlamydia trachomatis, Trichomonas vaginalis, Condylomata acuminata), foreign body, polyps, skin tags, tumours, ectopic ureter, urethral prolapse, lichen scleroses, haemangiomas, labial adhesions, trauma, systemic disease, child abuse

Referral: Paediatric Hospital/Surgery: see DD

3.26 Whooping cough

= pertussis, highly contagious acute respiratory illness caused by Bordetella pertussis, droplet infection, incubation 1 - 2 wk, contagious: without AB probably duration of cough, with AB: 1 wk

Clinical manifestation: typical (older children): catarrhal stage 1 - 2 wk: (mild cough and coryza, fever uncommon; gradually increases instead of improving and the coryza remains watery), Paroxysmal stage 2 - 8 wk: paroxysmal cough: a long series of coughs between which there is little or no inspiratory effort, may gag, develop cyanosis, appear
to be struggling for breath, inspir. stridor (whoop), sweating episodes, more bothersome at night, convalescent stage: cough subsides over several weeks to months

atypical (infants): catarrhal stage, than gagging, gasping, eye bulging, vomiting, cyanosis, bradycardia (or tachycardia if illness is severe); the cough may or may not be paroxysmal, complications!

⚠️ Caution: in infants: failure to thrive, apnoea, pneumonia, respiratory failure, seizures, pulmonary hypertension, hypotension/shock, renal failure, death

💡 Treatment: the earlier - the better: Clarithromycin 15 mg/kg BW/d in 2 doses, duration 14 d (at least first 3 wk after onset of cough useful), later in the course of disease AB probably does not affect the course of symptoms, may reduce the spread to others, most children will clear pertussis infection without antibiotic treatment within six weeks; fluid, nutrition, cough-medicine

โปรด: Paediatric Hospital (inform first): infants, complications

ℹ️ Isolation: stay at home! inform health authority

🌼 Vaccination: Pertussis 3 x + booster every 10 yr (see national vaccination programme)
4. **School-aged children**

4.1 **Anaphylaxis**

= acute, potentially life-threatening, multi system syndrome caused by the sudden release of mast cell mediators into the systemic circulation (Type 1 allergic reaction)

🔍 Clinical manifestation:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Skin</th>
<th>Abdomen</th>
<th>Respiratory tract</th>
<th>Circulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>pruritus</td>
<td>nausea</td>
<td>rhinorrhea</td>
<td>tachycardia (increase &gt;20/min)</td>
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<tr>
<td></td>
<td>flush</td>
<td>abd. cramps</td>
<td>hoarseness</td>
<td>hypertension</td>
</tr>
<tr>
<td></td>
<td>urticaria</td>
<td>vomiting</td>
<td>dyspnea</td>
<td>arrhythmia</td>
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<tr>
<td></td>
<td>angiooedema</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>pruritus</td>
<td>vomiting</td>
<td>larynxoedema</td>
<td>shock</td>
</tr>
<tr>
<td></td>
<td>flush</td>
<td>defecation</td>
<td>bronchospasm</td>
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</tr>
<tr>
<td></td>
<td>urticaria</td>
<td></td>
<td>zyanoses</td>
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<tr>
<td></td>
<td>angiooedema</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>pruritus</td>
<td>vomiting</td>
<td>respiratory arrest</td>
<td></td>
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<tr>
<td></td>
<td>flush</td>
<td>defecation</td>
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<tr>
<td></td>
<td>urticaria</td>
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<td></td>
<td>angiooedema</td>
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</tr>
<tr>
<td>IV</td>
<td>pruritus</td>
<td>vomiting</td>
<td>circulatory arrest</td>
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<tr>
<td></td>
<td>angiooedema</td>
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</tbody>
</table>


➕ Treatment: Removal of the inciting antigen, call for help, if anaphylaxis >2: Epinephrin as soon is possible, volume repletion

Epinephrin 1:1000 (1 ampule = 1 mg/ml):

0.1 ml (= 0.1 mg)/10 kg BW (max. 0.5 ml/dose) i.m. OR

< 6 yr: 0.15 ml / < 12 a: 0.3 ml /> 12 yr/adult: 0.5 ml i.m.

⚠️ Caution: **Epinephrin pure** only intramuscular *(Not i.v.)*

according to grade of anaphylaxis:

Fenistil: (Dimetinden, H1 blocker, 1 amp. = 4 mg): slowly i.v. 0.1 mg / kg BW - max. 1 amp.

Ulsal: (Ranitidin, H2 blocker, 1 Amp. = 50 mg): slowly i.v. 25 mg, > 12 yr 1 amp.

Solu-Dacortin: (Prednisolon, 1 Amp. = 250 mg): bolus i.v. 2 - 5(-10) mg / kg BW-max. 1 amp.

NaCl 0.9 %: bolus i.v. 20 ml / kg BW - max. 3 x times
4.2 Pneumonia, atypical

Mycoplasma pneumoniae, Chlamydia pneumoniae, viral (rare fungal, Chlamydia trachomatis, Pneumocystis in immunocompromised)

Clinical manifestation: all ages (most common in children > 5 yr), abrupt onset: malaise, myalgia, headache, rash, conjunctivitis, photophobia, sore throat, headache, gradually worsening, nonproductive cough, polyphonic wheezing, WBC often normal, elevated ESR in bacterial infection (if obtained), abdominal pain, cough may persist for many months; moderate dyspnoea on exertion for 2 - 3 mo; pneumonia viral: gradual onset, preceding upper airway symptom, non toxic appearing, diffuse, bilateral wheeze

Treatment: if viral pneumonia: No antibiotic treatment is indicated!, supportive care, susp. atyp. bacteria: Clarithromycin 15 mg/kg BW in 2 doses 7 - 10 d (max. 2 x 500 mg), evt. Azithromycin/Levofloxacin/Moxifloxacin, consider Sultanol 0.1 mg 2 - 4 puffs + Chamber or disc up to every 4 h, cough medicine (herbal remedies without alcohol, sugar), sufficient fluid intake, rest;

Caution: consider other pathogens according to clinical manifestations, avoid chest-x-ray in typical course

Differential diagnosis: Pneumonia, community acquired, aspiration pneumonia, Whooping cough, Atelectases, round pneumonia: congenital lung sequestration, metastatic Wilms tumor, cavitary necrosis, pleural pseudocyst, primary lung carcinoma, tuberculoses, pleural effusion/empyema Lung abscess, necrotizing pneumonia, pneumatocele

Referral: Paediatric Hospital: < 6 mo, hypoxemia (SpO2 < 90 % in air), Dehydration, inability to maintain hydration/feed orally; moderate to severe respiratory distress (RR > 70/min < 1 yr, RR > 50/min > 1 yr, difficulty breathing (grunting, nasal flaring, retractions), pathogen with increased virulence (Staphylococcus aureus or group A Streptococcus), failure of outpatient therapy (worsening or no response in 48 - 72 h)

Isolation: stay at home if relatively well

Vaccination: none (if viral: influenza vaccine yearly)

4.3 Scarlet fever

Group A Streptococcus (GAS), Streptococcus pyogenes, droplet infection, close contact, repeated infection possible

Clinical manifestation: abrupt onset, fever, headache, abdominal pain, nausea, vomiting, sore throat, poor oral intake, exudative tonsillopharyngitis, enlarged erythematous tonsils, enlarged tender anterior cervical lymph nodes, palatal petechiae, inflamed uvula, scarlatiniform rash (erythematous, finely papular rash which characteristically starts in the groin and axilla and then spreads to the trunk and...
extremities, followed by desquamation), if no rash: ‘streptococcal pharyngitis’

**Treatment:** supportive with NSAIDs, cool drinks, ice cream, oral penicillin V (Ospen) 100 000 IE/kg BW/d in 2 - 3 doses (max. 2 Mio IE/d) for (7)-10 d (if penicillin allergy: Clarithromycin 15 mg/kg BW/d in 2 doses 7 d), asymptomatic carrier are not treated! follow up if brown urine, swollen lids, arthralgia, ill appearance, persistent fever, ... any sign of Caution (see below)

**Caution:** non suppurative complications: acute rheumatic fever (carditis, arthritis, erythema marginatum, Chorea minor (Sydenham), poststreptococcal reactive arthritis (PSRA), poststreptococcal glomerulonephritis,Streptococcal toxic shock syndrome, paediatric autoimmune neuropsychiatric disorders associated with streptococcus (PANDAS), toxic shock like syndrome, suppurative complications: Tonsillopharyngeal cellulitis or abscess, Otitis media, Sinusitis, Necrotizing fasciitis, Streptococcal bacteraemia, Meningitis or brain abscess, Jugular vein septic thrombophlebitis, osteomyelitis; don’t miss kawasaki’s disease!

**Referral:** Paediatric hospital: severe disease, low compliance, susp. of Caution (see above)

Isolation: at home for 48 h after start of antibiotic therapy

Vaccination: none available

### 4.4 Sore throat

*angina, pharyngitis*, usually viral infection (Adeno-, Coxsackie-, EBV-, CMV-, ...) or group A Streptococcus, less common other bacterial infections, respiratory allergies, irritant inhalants, dryness, trauma (e.g., hot liquids, foreign body injury, caustic ingestion, inhaled toxic gases)

**Caution:** don’t miss bacterial infection with GAS!

**Treatment:** supportive care: rest, fluids, voiding cigarette smoke (including second hand smoke) and other respiratory irritants, avoiding acidic foods / beverages, soft diet, ice cream, NSAIDs, Acetaminophen, specific treatment only in susp. bacterial infection: GAS tonsillitis, other bacterial infection (HIB, pneumococcal etc: Amoxicillin)

### 4.5 Tinea

Dermatophyte infections common, cause tinea pedis, tinea corporis, tinea cruris, Majocchi’s granuloma, tinea capitis, and tinea unguium (dermatophyte onychomycosis)

**Clinical manifestation:** Interdigital tinea pedis: pruritic, erythematous erosions / scales between toes, interdigital fissures may cause pain; Hyperkeratotic (moccasin-type) tinea pedis: diffuse hyperkeratotic eruption involving soles, medial and lateral surfaces of the feet moccasin distribution, underlying erythema; Vesiculobullous (inflammatory) tinea pedis: pruritic, sometimes painful, vesicular or bullous eruption, underlying erythema, Tinea corporis: pruritic, circular or oval, erythematous, scaling patch or plaque that spreads centrifugally, annular (ring-shaped) plaque, multiple plaques may coalesce,
pustules occasionally

⚠️ Caution: Nystatin is not effective, recurrences common

✅ Treatment: Most dermatophyte infections can be managed with topical treatments i.e. terbinafine 1% cream applied 1 - 2 x/d, 7 - 10 d, keep dry, wash clothing with 60°C

🌟 Referral: Paediatric hospital / Paediatric dermatology: severe disease, Tinea capitis, immunosuppressed (systemic therapy?)
5. Adolescents

5.1 Gastritis

Inflammatory process of gastric mucosa, infectious (Helicobacter pylori) or autoimmune or endogenous or exogenous irritants (bile reflux, alcohol, NSAIDs, ischaemia, physical stress, chronic congestion)

Clinical manifestation: upper abdominal pain, associated with food, nausea, possible signs of reflux like heartburn, feeling bloated, upper abdomen, anorexia, chronic hoarseness or stridor, dysphagia (difficulty swallowing), recurrent regurgitation

Treatment: lifestyle modification: avoid carbonic acid, caffeine, too hot/spicy/cold food, alcohol, stress; antacids: Calcium carbonate, magnesium hydroxide, Surface agents: Sucralfate 4 x 1 ml < 5 yr, 4 x 2 ml < 10 yr, 4 x 3 ml > 10 yr, histamine blockers: ranitidine (Zantac), proton pump inhibitors: Omeprazole 1-2 mg/kg BW/d in 2 ED (max. 40 mg), H.p. pos: PPI + Amoxicillin + Clarithromycin for 7 d (first-line eradication)

Caution: if H.p. suspected: stool antigen testing, follow up!

Referral: Paediatric hospital: if no significant improvement with treatment after 1 months, signs of bleeding, recurrence after treatment, atypical presentation

5.2 Gynecomastia

Benign proliferation of glandular tissue of the male breast, common in infancy, adolescence, middle-aged to older men; often breast-development in girls also initially unilaterally

Differential diagnosis: pseudogynecomastia in obese patients: fat deposition without glandular proliferation, drugs (spironolactone etc.), cirrhoses, malnutrition, male hypogonadism, tumor, hyperthyroidism, CKD/dialysis, precocious puberty,

Tanner stages:
Clinical manifestation: harmless: rubbery or firm mass extending concentrically from the nipple(s), soft, well moveable

Caution: precocious puberty (girls < 8 yr, boys < 9 yr), Breast cancer extremely rare

Referral: Paediatric Hospital: see differentials

5.3 Infectious mononucleosis

*kissing disease*, Epstein-Barr virus (EBV) - herpesvirus, droplet infection - close contact, incubation 10 - 14 d (max. 50 d), persists asymptotically for life, associated with the development of lymphomas, approx. 90 - 95 % of adults EBV-seropositiv (often subclinical infection),

Clinical manifestation: malaise, headache, low-grade fever, tonsillitis and/or pharyngitis, cervical lymph node enlargement and tenderness, moderate to high fever, tonsillar exudate can have a white, grey-green, necrotic appearance, severe fatigue may be prominent, less common: palatal petechiae, periorbital/palpebral edema, maculopapular or morbilliform rashes, nausea, vomiting, anorexia, mild hepatitis, splenomegaly, mostly recover uneventfully, acute symptoms resolve in one to two weeks, fatigue often persists for months

Caution: splenic rupture, hypersplenism, ampicillin rash, pneumonia, myocarditis, pancreatitis, mesenteric adenitis, myositis, glomerulonephritis, genital ulceration, neurologic syndromes (e.g. Guillain-Barré syndrome, facial nerve palsy, meningoencephalitis, aseptic meningitis, transverse myelitis, neuritis), Haematologic abnormalities
Treatment: supportive (see sore throat\textsuperscript{B34}), avoid Penicillin/Ampicillin (Type 4 allergic reaction very common)! if splenomegaly - no sports for 3 wk, steroids - controversial

Referral: Paediatric Hospital: see Caution

5.4 Lyme disease

spirochetes Borrelia burgdorferi, arthropod-borne infection (tick born)

Clinical manifestation: acute infection: tick bite often not recognised, initial redness - no sign of Lyme disease! Erythema migrans: rash at the site of the tick bite, flat and without scale, annular, may be pruritic or burning, vary greatly in shape and rarely is perfectly round usually within 7 - 14 d after the bite, multiple erythema possible, may be accompanied by systemic findings, if not treated - see stages below; there is no clear evidence of chronic Lyme disease if treated;

<table>
<thead>
<tr>
<th>Manifestation</th>
<th>Early stage</th>
<th>Late stage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stage I</td>
<td>Stage II</td>
</tr>
<tr>
<td>Skin ~ 80 %</td>
<td>Erythema migrans (EM)</td>
<td>Multiloc. EM Lymphocytoma</td>
</tr>
<tr>
<td>Neuro-System ~ 10 %</td>
<td>-</td>
<td>Facial nerve pareses, aseptic meningitis, meningoradiculitis, u.a.</td>
</tr>
<tr>
<td>Joints ~ 10 %</td>
<td>-</td>
<td>Arthralgia (polyarticular migratory oligoarthritis)</td>
</tr>
<tr>
<td>Others</td>
<td>-</td>
<td>Carditis, hepatitis and others</td>
</tr>
</tbody>
</table>

Figure 6: Stages of Lyme disease

Caution: Serology: clear history + symptoms = diagnoses in early stages, serology often misleading - do not screen for borrelioses, IgM and IgG can be positive for years, if no seroconversion after 4 wk - stop testing!, IgG level is not influenced by treatment - therefore no follow up serologically useful, negative wk does in general not exclude infection, in case of Borrelia - arthritis - sensitivity nearly 100 %; within 24 h after initiation of treatment Jarisch-Herxheimer reaction possible
5.5 **Migraine**

occurs at all ages and may even begin in infancy, prevalence increases throughout childhood (10 yr prevalence 5 %!).

**Clinical manifestation:** recurrent attacks last 2 - 72 h, with or without aura in phases, Prodromal phase: affective, vegetative, sensitivity symptoms (euphoria, fatigue, irritability, social withdrawal, food cravings, urinary or bowel changes, neck stiffness, increased yawning, pallor, shadows under the eyes); Migraine aura most often visual (enlarging scotoma, scintillations, fortification spectra), sensory, language, motor, brainstem-type, retinal; Migraine headache phase: throbbing or pulsatile quality, in children more bifrontal, bitemporal, or generalized than unilateral, accompanied by nausea, sensitivity to light and noise, typically want to lie down in dark, quiet room, may obtain relief with sleep (Photophobia / phonophobia); Migraine postdrome: feel drained or exhausted, mild elation or euphoria, see ICHD-3 criteria

**Caution:** atypical migraine, hemiplegic migraine (DD stroke, enc. diss.), > 3 d

**Treatment:** general measures: education, identify triggering factors (e.g., stress, poor sleep habits, irregular meals, odours, weather changes, specific foods, menstrual cycles), to avoid if possible, headache diary, rest or sleep in a dark, quiet room, cool cloth applied to the forehead, medication: Coffein, Ibuprofen 1 mg/kg BW/dose (max. 600 mg/dose), Paracetamol 15 - 20 mg / kg BW/dose (max. 1 g).

**Referral: Paediatric Hospital:** susp. secondary headaches, > 3 d complaints, treatment-failure, chronic of often recurrent attacks (triptanes, amitryptilline, ...?)

5.6 **Shingles**

= Varicella-zoster virus (VZV, herpesvirus), causes varicella (chickenpox) and herpes zoster (shingles)

**Clinical manifestation:** painful (less in children than in adults), unilateral vesicular eruption on erythematous ground, usually in a restricted dermatomal distribution, mainly unilateral

**Caution:** postherpetic neuralgia, bacterial skin infection, uveitis, keratitis, motor neuropathy, meningitis, cerebellitis, Herpes zoster oticus, prenatal infection

**Treatment:** supportive: Acetaminophen, NSAIDs, zinc-lotion, in immunocompetent child oral antiviral therapy not recommended

**Referral: Paediatric Hospital:** see caution
**Isolation:** if possible at home until lesions crusted

- **Vaccination:** Varilrix 2 x + no booster (be aware: life vaccine!), also protects from shingles, poss. combination vaccine: MMR-V

<table>
<thead>
<tr>
<th>Remember: Herpes-viridae</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. VZV: chicken pox(^\text{16}) and shingles(^\text{19})</td>
</tr>
<tr>
<td>2. Herpes simplex virus (HSV Type 1, Typ2): herpetic gingivostomatis(^\text{19}), herpetic Vulvoganitis; <strong>Reactivation:</strong> labial herpes, genital herpes</td>
</tr>
<tr>
<td>3. Ebstein-Barr-Virus (EBV) → infect. mononucleoses(^\text{17})</td>
</tr>
<tr>
<td>4. Cytomegalie-Virus (CMV) → flue like (see EBV)</td>
</tr>
<tr>
<td>5. Human Herpesvirus 6 (HHV-6) → 3-day-fever(^\text{15})</td>
</tr>
</tbody>
</table>
6. Tables, Workflows, etc.

6.1 Rash differentials

Questions:
1. blanching - non blanching?
2. systemic or local?
3. acute or chronic?
4. progression in stages?

![Diagram of rash differentials]

- exanthematous ("progression in stages")
  - Varicella zoster,
  - Measles, Mumps, Rubella,
  - Fifth disease,
  - 3-day fever,
  - Hand-foot-mouth disease,
  - Herpes simplex,
  - Epstein-Barr virus / Cytomegalovirus,
  - Scarlet fever

- Eczema ("not contagious")
  - Atopic dermatitis,
  - Contact dermatitis,
  - Seborrheic dermatitis

- Other rashes
  - Petaechiae / Purpura / Bruising,
  - Thrush,
  - Tinea,
  - Impetigo contagiosa,
  - Molluscum contagiosum,
  - Erythema migrans (Borrelia burgdorferi),
  - Parasites
  - ... and many none-specific

Figure 6: Common causes for rashes in children (Anita Mang)

6.2 Fever

- fever is not a disease - it's only a symptom
- > 38.5 °C rectal (axilla / ear drum difference -0.3 °C bis -0.5 °C)
- single measurement ≠ decisive
- treatment according to general condition of the patient (pain, etc.), do not only treat temperature!
6.3 **Structured history taking**

Figure 7: structured history according to AMPLE

6.4 **Triage at the admission with AVPU**

Figure 8: triage in your practice registration

6.5 **V/P/U: structured approach with ABCDE**

⚠️ Caution: stay calm! watch! use all senses, auscultate first - than undress
<table>
<thead>
<tr>
<th>A</th>
<th>Airway</th>
<th>safe, endangered, obstructed</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Breathing</td>
<td>breathing rate, breathing work, oxygenation</td>
</tr>
<tr>
<td>C</td>
<td>Circulation</td>
<td>heart rate, skin: capillary refill time / colour (marbling?) / temperature! / pulse qualities (central/peripheral), blood pressure, preload (JVP, liver, lung oedema), urine production?</td>
</tr>
<tr>
<td>D</td>
<td>Disability</td>
<td>AVPU, motor function/strength/tonus/reflexes/coord./sensibility, pupils, blood glucose level</td>
</tr>
<tr>
<td>E</td>
<td>Exposure</td>
<td>rash? signs of injury? evidence of abuse? weight: kg = (age + 4) x 2</td>
</tr>
</tbody>
</table>

Figure 9: structured approach to patient in emergency
### 6.6 Referral to hospital (+911)

<table>
<thead>
<tr>
<th>A</th>
<th>Airway</th>
<th>Airways at risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Breathing</td>
<td>tachypnea (&gt; 60 breaths/min), bradypnea, apnea, gasping, fatigue, paradoxical breathing, silent chest, cyanosis, SpO2 &lt;90%</td>
</tr>
<tr>
<td>C</td>
<td>Circulation</td>
<td>sweating, mottled, pale-greyish skin (recap. &gt; 3 sec), tachycardia (HR &gt; 200/min), arterial hypotension (very late sign)</td>
</tr>
<tr>
<td>D</td>
<td>Disability</td>
<td>decreased consciousness, muscular hypotonia (floppy)</td>
</tr>
<tr>
<td>E</td>
<td>Exposure</td>
<td>Ecchymosis, Signs of child abuse</td>
</tr>
</tbody>
</table>

Figure 10: Decision making according to ABCDE - hospital referral?
# Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>min</td>
<td>minute(s)</td>
</tr>
<tr>
<td>h</td>
<td>hour(s)</td>
</tr>
<tr>
<td>d</td>
<td>day(s)</td>
</tr>
<tr>
<td>wk</td>
<td>week(s)</td>
</tr>
<tr>
<td>mo</td>
<td>month(s)</td>
</tr>
<tr>
<td>yr</td>
<td>year(s)</td>
</tr>
<tr>
<td>kg BW</td>
<td>kilogram bodyweight</td>
</tr>
<tr>
<td>poss.</td>
<td>possibly</td>
</tr>
<tr>
<td>max.</td>
<td>maximum</td>
</tr>
<tr>
<td>min.</td>
<td>minimum</td>
</tr>
<tr>
<td>p.o.</td>
<td>per os</td>
</tr>
<tr>
<td>i.v.</td>
<td>intravenous</td>
</tr>
<tr>
<td>q.d.</td>
<td>once a day</td>
</tr>
<tr>
<td>b.i.d.</td>
<td>twice a day</td>
</tr>
<tr>
<td>t.i.d.</td>
<td>three times a day</td>
</tr>
<tr>
<td>q.i.d.</td>
<td>four times a day</td>
</tr>
<tr>
<td>prn.</td>
<td>as needed</td>
</tr>
<tr>
<td>gtt</td>
<td>drops</td>
</tr>
</tbody>
</table>
8. Literature

- UpToDate, 2018
- EBM Guidelines, 2018
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- National Vaccination Programme, Austria, 2018
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Index

- **A** -
  Abbreviations 45
  ABCDE 42
  Abdominal pain 15
  Ampicillin rash 37
  Anaphylaxis 32
  Angina 34
  Appendicitis 15
  Asthma, acute exacerbation 16
  Atopic dermatitis 12
  Atopic eczema 12
  AVPU 42
  AVPU: structured approach 42

- **B** -
  Bohn's nodules 9
  Borrelia burgdorferi 38
  Bronchiolitis 7
  Bronchitis, obstructive 13

- **C** -
  Campylobacter 19
  Candidal infection 8
  Chickenpox 16
  Circumcision 25
  Conjunctivitis, acute bacterial 7
  Constipation 15
  Constipation, acute 17
  Contact dermatitis 22
  Croup 21

- **D** -
  Dermatophyte infections 34
  Diaper rash 8

- **E** -
  Ectopic Testes 10
  Epinephrin 32
  Epstein-Barr virus 37
  Epstein-Pearls 9
  Erythema infectiosum 18
  Erythema migrans 38
  Erythema toxicum neonatorum 8
  Exanthema subitum 13

- **F** -
  Fever 41
  Fifth disease 18
  Foreign body, respiratory tract 18

- **G** -
  Gastritis 36
  Gastroenteritis 15
  Gastroenteritis, acute 19
  Group A Streptococcus (GAS) 33
  Gynecomastia 36

- **H** -
  H. pylori 36
  Hand, foot, and mouth disease 19
  head trauma, minor 27
  Herpangina 19
  Herpes simplex virus 19
  Herpes, labial 19
  Herpes-viruses 39
  Herpetic gingivostomatitis 19
  HHV-6 13
  History taking 42
  Human parvovirus B19 18

- **I** -
  Impetigo contagiosa 20
  Infantile colic 9
  Infectious mononucleosis 37
  Interdigital tinea pedis 34
  Intussusception 15
  Irritant diaper dermatitis 8

- **K** -
  Kissing disease 37

- **L** -
  Labial adhesions 9
  Laryngotracheitis, viral 21
  Lipp licking dermatitis 22
  Literature 46
  Lyme disease 38
- M -
Measles 22
Mesenteric lymphadenitis 15
Migraine 39
Milia 9
Molluscum contagiosum 23
Mumps 23

- N -
Newborn eczema 8
nursemaid's elbow 28

- O -
Otitis externa 24
Otitis media, acute 24

- P -
Paraphimosis 25
Perianal Eczema 25
Pertussis 30
Pharyngitis 34
Phimosis 25
Pinworm 25
Pneumonia viral 33
Pneumonia, atypical 33
Pneumonia, community acquired 26
Pneumonia, viral 26

- R -
Radial head subluxation 28
Rash differentials 41
Referral to hospital 44
Retractile testes 10
Roseola infantum 13
Rubella 26

- S -
Salmonella 19
Seborrhoeic dermatitis, infantile 10
Shigella 19
Shingles 39
sore throat 34

- T -
Tables 41
Tanner stages 36
Testicular descent anomalies 10
Thermal injury, low grade 28
Three-day fever 13
Thrush 8
Tinea 34
Trauma 27
Triage 42

- U -
Umbilical granuloma 11
Undescended testes 10
Urinary tract infection (UTI) 29

- V -
Varizella 16
Vulvovaginitis 30

- W -
Whooping cough 30
Workflows 41

- Z -
Zoster 16

Streptococcal perianal dermatitis 25
streptococcal pharyngitis 33
Streptococcus pyogenes 33
Synovitis, transient 27

Sore throat 34